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Smetana, Ales. 1995. Rove beetles of the subtribe Philonthina of America north of Mexico (Coleoptera: Staphylinidae): Classification, phylogeny and taxonomic revision. Memoirs on Entomology, International, Vol. 3, x + 946 pp. (ISBN 1-56665-058-5). Available from Associated Publishers, P.O. Box 140103, Gainesville, FL 32614-0103, U.S.A. (Tel/Fax 352-371-4071). Price (hardcover): U.S. \$125.00 plus \$5.00 shipping.

This early entry in a new publication series is a monographic systematic treatment for North America of a large and difficult group of predatory staphylinid beetles. This group includes some of the most frequently encountered rove beetles, many accidentally introduced from Europe or elsewhere and commonly found in association with humans. The abundance of many species suggests they may play an important ecological role in some habitats, and some species have been recommended as possible biocontrol agents for agricultural pest insects. However, accurate identification of the more than 200 similar-looking species in North America has been very difficult for even specialists on staphylinids, and a great many new names, introductions, and taxonomic changes have accumulated since the last full review of Nearctic species by G. H. Horn more than a century ago. These taxonomic and identification problems have prevented full exploitation of the potential role of this group in ecological and biocontrol studies.

Smetana is perfectly positioned to undertake a study like this. He has published extensively on the taxonomy of many groups of Staphylininae throughout his career, and is as familiar as anyone has ever been with the entire Holarctic fauna of this

group; recently he has also worked on the Oriental fauna. He completed thorough revisions of the two next-largest groups of

this subfamily in North America, Quediina and Xantholinini, in 1971 and 1982, respectively. His exhaustive treatment of Philonthina here extends this tradition of comprehensive and very useful revisions to the largest group of the subfamily.

Smetana's revision, in preparation for more than a decade, is a monumental study providing comprehensive treatment of all included species, with sweeping taxonomic changes. Based on study of about 100,000 specimens from nearly 50 institutions and individuals, it covers 208 species in eight genera of Philonthina, excluding only three small genera of the subtribe whose North American species have been revised recently by others (*Cafius*, *Erichsonius* and *Neobisnius*, with about 42 species total). Sixty new species and three new subspecies are described, six new generic and 73 new species-group synonymies proposed, one genus resurrected, four neotypes and 121 lectotypes designated, and 75 new combinations proposed including some for Palearctic species. A significant number (29) of the 208 species are documented as adventive, mostly originating from Europe;

many are first reported here.

The extensive introductory sections provide a detailed overview of the group, including taxonomic history, natural history, immature stages, fossils, and morphology including a review of diagnostic characters. An admittedly preliminary phylogenetic analysis of most North American genera attempts to "give evidence for or against the monophyly of some genera" (see discussion below). The main systematic treatment starting on p. 47 includes identification keys to the eight world subtribes of Staphylinini, all 14 Holarctic genera of the subtribe Philonthina, and the 208 Nearctic species of the eight genera included in the revision. The treatment for each genus includes synonymy, general description, and other discussion, and a good habitus drawing of at least one species. Each of the larger genera is divided into a series of informal species groups, a very flexible approach that is certainly preferable in our present state of knowledge of Staphylinidae to the formal recognition of subgenera with resultant nomenclatural clutter (as illustrated, e.g., by the messes in *Atheta* and *Leptusa*). Species treatments include full taxonomic data with synonymies and discussion of types and taxonomic changes; detailed descriptions, accompanied by nearly 1500 figures of male genitalia and other structures including many scanning electron microscope photos; full data on specimens examined including indication of source collections (except for a few very common species where only a list of states and provinces is given), with overall distributions summarized in the text and shown on 107 fairly detailed "dot"

maps; and comments on the bionomics and recognition of the species. Although Mexico is not formally included in the area covered by this revision, Smetana evidently studied many Mexican specimens, and in the case of North American species that also occur in Mexico he includes Mexican records in the "Material studied" lists and on maps; at least 10 species are reported from Mexico for the first time. Species ranges that extend further south or into the Old World are indicated only in a general way in the text.

Most of the basic taxonomic work is done very well, in the style of Smetana's earlier revisions. Many new characters useful for identification and phylogenetic analysis are introduced or first surveyed throughout this group. The higher classification adopted is reasonable at the present state of knowledge. Curiously, in arguing for combining the subtribes Triacrina and Xanthopygina (p. 47), Smetana implies that a 1992 work by Newton and Thayer found "character states justifying the separation of Triacrina from Xanthopygina" and cites his own 1977 work for showing that Triacrina have "all the character states of Xanthopygina", but neither of the cited works discuss any relevant character states for these groups. The keys generally seem to work, with some exceptions, especially in the subtribe key when applied to non-Holarctic faunas (e.g., the separation of Philonthina from Staphylinina using the shape of the ligula is not only difficult to use in practice but also unreliable because both states given occur even among Neotropical species of the genus

Platydracus). Most unfortunate, however, is his choice of how to count the dorsal pronotal punctures, an important systematic character in the species keys. After noting in the introduction (p. 29) that "there is little doubt that the authors who consider the first puncture, usually situated slightly laterad of the dorsal row, as belonging to the anterior marginal punctures and not homologous with the genuine punctures of the dorsal rows, are correct", he decides to "follow Erichson and most other authors, mostly for practical reasons, in considering this puncture as part of the dorsal rows". This choice is thus theoretically questionable as well as non-intuitive, and is not highlighted or illustrated with a labeled figure; a colleague who tried the *Philonthus* key and promptly veered off course using this character will doubtless not be the last to curse it!

Although Smetana went to considerable effort to examine and discuss type material of hundreds of names, there are some quite serious omissions in this area, especially involving Neotropical species that extend into North America. In some cases (e.g., *Philonthus furvus*, *P. piceatus*, *P. pauxillus*, and *Belonuchus rufipennis*), several very similar species occur together in the vicinity of type localities in Mexico, Central or South America, hence there is a good chance that these names have not been correctly interpreted by later authors and in this revision. Smetana also adopted the unfortunate taxonomic habit of listing all synonyms as if they were originally proposed as full species; in the introduction (p. 44) he notes that he automatically treated varieties and even aberrations that may not

be available names this way, leaving the task of determining the original status and availability of these names to others (and raising the possibility that some unavailable names will be inadvertently adopted because they appear to be available). Another area where Smetana's judgement seems questionable concerns three supposedly adventive species (*Gabrius coxalus*, *G. splendidulus* and *G. velox*) reported from North America for the first time here. The only cited North American records for each of these species are from very old specimens with state-only labels from one insect collection (Museum of Comparative Zoology) that includes many similar specimens that are known to be mislabelled. Smetana's unquestioning acceptance of these records is not consistent with his statement (p. 43) that "Specimens with very doubtful locality records (mislabelled specimens) are not mentioned in the text or located on the maps." In my opinion, these three species should not be considered as part of the North American fauna until reliable records have been found.

The phylogenetic analysis (pp. 32-42) is seriously flawed from the start; not only is it based on a regional rather than world fauna, but it inexplicably excludes the three North American genera (*Cafius*, *Erichsonius* and *Neobisnius*) that were already revised and hence are justifiably excluded from the species revision. Within these severe constraints, the analysis is mostly reasonably well done. It includes two outgroups (a "generalized member" each of the subtribe Staphylinina and subfamily Paederinae, the

latter being less appropriate than another subtribe of Staphylinini such as *Quediina* or another tribe of Staphylininae such as *Platypsopini* and 65 ingroups, a majority of which are species groups rather than individual species. The 71 characters (many first used here) surveyed in these taxa include some multi-state characters, for a total minimum possible tree length of 108. The statistics for the strict consensus tree obtained with Hennig86 (length = 388, consistency index = 27, retention index = 53) are not great, but in fact should be lower still because autapomorphies of terminal taxa are included in the analysis. Twenty two characters plus 20 states of the multistate characters are uninformative with respect to the analysis for this reason; excluding these would yield a consistency index of only 19. This high degree of homoplasy in many characters, and the small number of informative characters relative to the number of taxa, result in little resolution near the base of the tree (i.e., at the generic level where resolution was most sought).

Smetana's purpose in undertaking this phylogenetic analysis is not really clear, since he ignores even the few supported results in his generic classification. For example, in the analysis the genera *Gabronthus* and *Laetulonthus* are members of a "well supported monophyletic group" that also includes three species groups of *Philonthus* (p. 41 and Fig. 1), and *Rabigus* likewise clusters with another species group of *Philonthus*, but these are maintained as genera distinct from *Philonthus*. These small genera have been widely recognized,

and retaining them "until a revision of the world fauna is completed and a complete data set is assembled" (p. 41) may be justifiable. Much more baffling and difficult to justify is Smetana's resurrection of the name *Bisnius* for a whole series of species groups that have been included in *Philonthus*. According to his analysis, and not contradicted by any discussion, *Bisnius* is a subgroup of *Philonthus* and is also paraphyletic with respect to two other genera, *Belonuchus* and *Gabrius*, that share the correlated character states of slender protarsi lacking modified pale setae. Considering this vague justification (no unique or other consistent characters for *Bisnius* are mentioned), the strong likelihood that the protarsal characters have arisen more than once (definitely so in other subtribes of Staphylinini), the need to make extensive formal taxonomic changes (most of the new combinations in this work result from the recognition of *Bisnius*), and uncertainties about which Old World species of *Philonthus* must be transferred to it (a list of such species is provided on p. 516 followed by the comment that the list "is by no means complete; it may need some corrections and certainly inclusion of additional species ..."), it seems that the separation of *Bisnius* from *Philonthus* is premature and should also have been postponed until the world review mentioned above is completed.

The overall production of the volume is very good, with few typos or inconsistencies for a work of this size. An annoying exception is the variable way in which states and provinces are highlighted in the

"Material studied" lists: either in all-capital letters or in normal type but boldfaced (the latter being far easier to search for). Another annoyance is the somewhat random numbering of figures on each plate; apparently the figures were numbered first and then assembled onto plates in such a way as to make maximum use of space without regard to sequence. There are a few curious geographic misinterpretations (e.g., "PATZCUARO: Edo. de Michoacan" on p. 158 should of course be the reverse), and some distribution symbols seem slightly misplaced on the maps (e.g., the dots off the coast of Florida for *Philonthus flavolimbatus* and *Belonuchus rufipennis*). These very useful distribution maps were said to be "generated ... using a computer program" (p. 47); it would have been nice to know more about how this was done, as a point of general information as well as an indication of how accurate the symbol placements might be. Serious typos include at least one misnumbered figure (the lower of two Fig. 783's on p. 858 should be 787) and one erroneous figure reference (Fig. 1446 in the second half of couplet 3 on p. 49 should be 1455).

Notwithstanding the above criticisms, Smetana's revision is clearly a tremendous accomplishment that will prove extremely useful to systematists and other biologists for a long time. Unfortunately, such large-scale, comprehensive revisions are likely to be less frequently seen in the future, as the number of systematic positions declines and those in such positions come under increasing pressure to focus on more "modern" or locally relevant approaches

and/or publish at a more frequent rate. Smetana is to be strongly commended for his perseverance in this massive project, and encouraged to complete the broader study of staphylinine genera alluded to in this work.

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